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147950

E.6
1972



From the desk of
EARL N. BRASFIELD

Bill Papageorge

CER 053225

CONFIDENTIAL 92-CV-204-WDS

004915

1920's - LIQUID WASTE FLOWED TO DEAD CREEK.

- SOLID WASTE BURIED ON SITE AND
SOUTH OF PLANT IN AREA E. OF
CERRO & NEAR VILLAGE HALL.

'31-33 - VILLAGE SEWER SYSTEM CONSTRUCTED
by WPA.

OVER FLOW FROM LUGK WENT TO
DEAD CREEK FOR EXCESSIVE RAIN
& FLOOD WATER.

'35 - DEAD CREEK DREDGED TO FLOW NORTH
FROM QUEENY AVE.

'38 - FILLED IN SNUGET VILLAGE HALL AREA
E. of CERRO.

CER 093226

'38 - ARCCOR PRODUCTION STARTED

'38-51- LANDFILL PRIMARILY DONE IN LUGK
SITE PROPER INCLUDING CURRENT
EDWIN CECER SITE AND LOT F
WEST OF HWY 3.

CONFIDENTIAL 92-CV-204-WDS

004916

47-51 PLUGGED CULVERT UNDER QUEENY
AVE. TO DEAD CREEK - STOPPED
ALL FLOW TOTALLY IN SEATED
DIRECTION.

'51-78 - LANDFILL AT RIVER USED FOR TOXIC
MATERIAL FROM WGK, JFG, & Gen.
OFFICES RES.

ALSO NITRO, PORT PLASTICS, & ILL. EPA.

'68 - CONCRETE PLUG POURED IN QUEENY
AVE. CULVERT TO PERMANENTLY
SEAL HOLE. NO MAJOR FLOW -
MADE CHANGE TO STOP EVEN RAIN
WATER.

'78 - WGK LANDFILL CLOSED -
& COVER COMPLETED IN 1980.

CER 053227

60-72 - WAGGONER TRUCKING WAS MAJOR
TRUCKER FOR WGK PLANT PRODUCTS,
INCLUDING OIL ADDITIVES AND SOME
MORE.

CONFIDENTIAL 92-CV-204-WDS

004917

From MONSANTO CHEMICAL COMPANY

At Monsanto, Illinois

Date April 30, 1957

To Miss Charlotte Perabo Reference

At Main Office

Subject W. G. KRUMMRICH PLANT HISTORY

Attached is a history of the W.G. Krummrich Plant history requested in your memo of April 10.

We have attempted to cover all significant happenings in as brief a manner as possible.

We will be glad to furnish additional information on request.


J. Cresce

pe

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ATTORNEY WORK PRODUCT
ATTORNEY CLIENT PRIVILEGE

cc

100-10-20

00

PLANT HISTORY

(1951 Name Change) May, 1957

Wm. G. Krummrich Plant

Organic Chemicals Division

formerly "B" Plant, Monsanto, Ill. Plant 1917-1951

The William G. Krummrich Plant is located in the village of Monsanto, Ill., approximately two miles south of East St. Louis. Total plant property consists of 250 acres, [including 16 acres leased from the Chemical Warfare Service], and 138 acres of unoccupied land situated outside of the main plant fence. Several other major plants are located in the village of Monsanto, including a Socony-Mobil Oil Company refinery, the American Zinc Company electrolytic plant, Lewin-Mathes Metal Company, Sterling Steel Casting Company, Darling Fertilizer Company, a plant and headquarters of the Midwest Rubber Reclaiming Company and the Cahokia Power Plant of the Union Electric Company of Missouri.

East St. Louis got its start primarily as a railroad and packing house center; but over the years, heavy industry has located in the area. East St. Louis has had a history of craft unionism, strikes as a result of union organization and conflict with the operating management of companies, racial violence, hoodlums engaged in labor relations or affecting labor relations, and in some cases, a poor labor relations attitude on the part of industry management. Today, the city has a population of approximately 100,000. The majority of plants in the area are absentee owned. Slow, steady progress has been made in the field of management, labor and community relations in the last decade; and the community is gradually losing much of its former unsavory reputation.

The village of Monsanto was incorporated in 1926 at a time when annexation of the area by the city of East St. Louis appeared imminent. The village occupies 1.65 square miles and has a population of 400. Many village residents work at one of the plants in the area. On the basis of per capita assessed valuation, the village is one of the wealthiest in the United States.

The Krummrich plant is well located from the standpoint of physical resources. It is approximately one mile from the Mississippi River and barges are used to transport certain raw materials and finished products. A river barge terminal is currently being constructed on plant property at the river front to derive further economic gains offered by barge transportation. Two railroads serve the plant: the Alton and Southern Railroad from the south side; the Terminal Railroad Association from the north side. Tracks run through the plant from north to south, connecting with both railroad lines. The west side of the plant is adjacent to a four-lane section of Illinois Highway #3 affording good access and egress for truck transportation.

The Krummrich plant had its beginning in 1907 when the Commercial Acid Company acquired the land and built a chamber sulfuric acid plant, a muriatic acid plant, and a nitric acid plant. The same year, the Sandoval Zinc Company built a unit for the manufacture of zinc chloride adjacent to the acid plants. In 1915 the Commercial

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Acid Company purchased the zinc chloride plant from Sandoval. With the entry of the United States into World War I, the business of the Commercial Acid Company increased. The plant prospered despite the fact that many additions to the plant were made by rule of thumb, i.e. a continuous succession of tearing down equipment which would not work properly and adding new equipment that also would not function as hoped. About this time, Monsanto was using many of the products produced by the Commercial Acid Company and saw the need for its own manufacture of these products to assure an adequate supply for internal consumption and future expansion. Monsanto purchased the Commercial Acid Company on November 1, 1917. At that time, the plant was producing phenol, salt cake, nitric cake and chlorosulfonic acid, in addition to sulfuric acid, muriatic acid, nitric acid and zinc chloride. The total plant employment in 1917 was 310.

CHRONOLOGICAL HISTORY OF PRODUCTS MANUFACTURED AT KRUMMRICH PLANT

| <u>Year</u> | <u>Product</u> |
|-------------|---|
| 1907 | - Started production of sulfuric acid, muriatic acid, nitric acid and zinc chloride. |
| 1916 | - Started commercial production of chlorosulfonic acid, phenol and salt cake. |
| 1925 | - Started production of chlorine and caustic. |
| 1926 | - Started production of chlorobenzols, p-nitroaniline and catalyst for contact sulfuric acid plants. |
| 1930 | - Started production of nitrated organic chemicals. |
| 1931 | - Started production of chlorophenols. |
| 1935 | - Benzyl chloride manufacture started. |
| 1935 | - Started production of Aroclors, hydrogenated products and phosphorus halides. |
| 1938 | - Started production of phosphoric acid. |
| 1947 | - Started production of 2,4-D, DDT and Santolubes in leased Chemical Warfare Service Plant. Started production of Santomerse #1 and alkylbenzene. |

Krummrich Plant History - 3

- 1950 - Started manufacture of potassium phenyl acetate.
- 1951 - Started production of monochloroacetic acid.
- 1954 - Started production of tricresyl phosphate and interim production of adipic acid.
- 1955 - Started production of phosphorus Pentasulfide.
- 1956 - Started production of Santolube 393 and fatty acid chloride.

CHRONOLOGICAL HISTORY OF IMPORTANT PHYSICAL EXPANSIONS OF PLANT

- 1907 - Constructed a four-chamber sulfuric acid department.

Constructed a four-furnace muriatic acid department.

Constructed four retort nitric acid department.

Constructed zinc chloride department.

Constructed powerhouse consisting of two 40 H.P. fire tube boilers.
- 1911 - Added wedge furnace to sulfuric acid plant to permit manufacture of pyrate instead of sulfur. Added concentrator to convert 60° BE acid produced to chambers to 66° BE acid.
- 1912 - Disastrous fire on January 8; destroyed sulfuric acid chambers, sulfuric acid concentrator, and most of muriatic acid department. Units rebuilt and expanded.
- 1915 - Nitric acid plant destroyed by fire.
- 1916 - Constructed two units to manufacture sulfuric acid by the contact process. Constructed enlarged nitric acid plant. Constructed chlorosulfonic acid department and a phenol plant.

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Krummrich Plant History - 4

- 1917 - Constructed new power house consisting of four boilers having a capacity of 1260 H.P.
- 1918 - Constructed third chamber unit for production of sulfuric acid.
- 1922 - Constructed chlorine plant, and new power plant on the site of the present power plant. Due to economic conditions, the chlorine plant was not placed in operation until 1925. Power plant consisted of 4-600 H.P. water tube Edgemoor boilers.
- 1925 - Constructed plant for production of chlorobenzols. Constructed plant for production of p-nitroaniline.
- 1930 - Constructed plant for production of nitrated compounds in old powerhouse, Bldg. BL.
- 1931 - Built plant for the production of chlorophenol. Increased the capacity of the phenol plant.
- 1935 - Constructed Diamond chlorine cell house.
- 1936 - Constructed facilities for the production of Aroclors, pyranols, phosphorus trichloride, phosphorus oxychloride, and hydrogenated products. Two 100,000# steam/hr. high pressure boilers added to powerhouse.
- 1937 - Expanded chlorobenzol production facilities.
- 1938 - Constructed horizontal burning unit for the production of phosphoric acid. Constructed department for the production of tetra sodium pyrophosphate.
- 1940 - Added one 100,000#/hr. high pressure boiler.
- 1941 - Expanded chlorine production facilities by adding Hooker cell house. Chemical Warfare Service plant constructed in North Area.
- 1942-44 - Phenol Department expanded by 66 per cent.

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Krummrich Plant History - 5

- 1946 - Expanded chlorine production facilities. Installed larger capacity Hooker cells and double effect caustic evaporators.
- 1947 - Constructed plant for the production of Santomerse and alkylbenzene. Two additional 100,000#/hr. high pressure boilers added.
- 1951 - Installed equipment for the production of monochloroacetic acid.
- 1953 - Added 200,000#/hr. steam boiler and new feed water treatment facilities.
- 1954 - Expanded alkylbenzene department. Expanded phosphoric acid production by construction of #3 burning unit. Expanded phosphorus trichloride and oxychloride production capacity. Expanded sulfuric acid facilities by the addition of a 400 T/day contact unit. Started construction of the phosphorus Pentasulfide plant. Expanded oil additives department by 40 per cent.
- 1955 - Constructed central HCl recovery plant.
- 1956 - Constructed units for the production of fatty acid chloride and Santolube 393.

HISTORY OF PLANT MANAGERS

| <u>Dates</u> | <u>Plant Manager</u> |
|--------------|----------------------|
| 1917-1930 | Dr. L. F. Nickell |
| 1930-1936 | Mr. F. B. Langreck |
| 1936-1941 | Mr. D. D. Dinsmoor |
| 1941-1943 | Mr. W. G. Krummrich |
| 1943-1950 | Mr. P. M. Tompkins |
| 1950-1955 | Mr. R. S. Wobus |
| 1955- | Mr. J. Cresce |

1959 - Salem ?

1966 - McChen ?

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HIGH LIGHTS OF PLANT HISTORY, OTHER THAN EXPANSIONS AND NEW PRODUCTS

- 1937 - Voluntary recognition granted to A.F.L. Union at plant, and first contract signed.
- 1941 - First strike in plant history. Strike essentially jurisdictional in nature over attempts of mechanical craftsmen to obtain better wages than rest of men in plant.
- 1951 - Plant named for W. G. Krummrich. Previously the plant had been known as Plant "B".
- 1956 - Plant broke previous all-time safety record on December 19, by working 2,580,461 hours without a lost-time accident.

PLANT EMPLOYMENT DATA

| <u>Year</u> | <u>Number of Employees</u> |
|-------------|----------------------------|
| 1917 | 310 |
| 1928 | 340 |
| 1938 | 731 |
| 1940 | 1000 |
| 1941 | 1188 |
| 1942 | 1667 |
| 1943 | 1628 |
| 1945 | 1447 |
| 1946 | 1568 |
| 1947 | 1598 |
| 1948 | 1981 |
| 1949 | 2027 |
| 1951 | 2100 |
| 1952 | 2352 |
| 1953 | 2160 |
| 1954 | 2073 |
| 1955 | 1902 |
| 1956 | 1929 |
| 1957 | 1907 |

Over 100 chemicals are produced at the Krummrich plant. The plant is primarily a producer of heavy and intermediate chemicals, many of which serve as raw materials for other operations in the Krummrich plant or other Monsanto plants. On the basis of the dollar value of manufacturing machinery and equipment, the Inorganic Chemicals Division owns approximately 38 per cent of the plant.

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ATTORNEY CLIENT PRIVILEGE

Krummrich Plant History - 7

Principal Inorganic Chemicals Division products include:

- | | |
|-------------------------|---|
| Sulfuric Acid | - Basic heavy chemical. Used in steel mills, oil refineries, tanneries. Used to manufacture fertilizer and phenol. |
| Phosphoric Acid | - A basic chemical used to manufacture fertilizer and food grade phosphates. Significant portion of plant's production is sold to the Carondelet plant for manufacture of various phosphates. |
| Alkylbenzene | - Used primarily for the manufacture of synthetic detergents. |
| Phosphorus Oxychloride | - Used to manufacture the various phosphate esters which are used as plasticizers and gasoline additives. |
| Phosphorus Pentasulfide | - Used internally in Monsanto to manufacture oil additives and insecticides. Sold externally to manufacture oil additives. |
| Vanadium Catalyst | - Catalyst for contact sulfuric acid plants. |

Principal Organic Division products include:

- | | |
|--------------------------------|--|
| Nitrochlorobenzene | - Used within plant to produce p-nitroaniline and p-nitrophenol. Significant portion of production sold to Queeny plant. |
| Phenol | - Basic organic building block chemical. Significant portion of plant output used by Plastics Division to produce phenolic resins. |
| Santosite (Sodium Sulfite) | - By-product from the phenol process. Used in paper manufacture and as a reducing agent to remove oxygen from boiler feed water. |
| Salt Cake (Sodium Sulfate) | - By-product from the phenol process primarily used to manufacture glass. |
| Chlorine, Caustic and Hydrogen | - All plant production used within plant to produce other chemicals. |

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ATTORNEY CLIENT PRIVILEGE

Krummrich Plant History - 8

| | |
|----------------------------------|--|
| Chlorobenzols | - Used as building blocks within plant to produce other intermediates. p-Dichlorobenzene (Santochlor) used as a mothicide and larvacide. |
| Pentachlorophenol | - Used to protect wood against rot and termites. |
| Benzyl Chloride | - Used as a building block within company to produce plasticizers, resins, pharmaceuticals and dyestuffs. |
| Aroclors | - Used as plasticizers, and dielectrics for condensers, capacitors and transformers. Used as a heat transfer medium, high temperature lubricants and hydraulic fluids. |
| Tricresyl Phosphate (G-Grade) | - Used as a gasoline additive. |
| Cyclonhexylamine | - Used to manufacture corrosion inhibitor and dyestuffs. |
| p-Nitrophenol | - Used to manufacture insecticides. |
| Santolubes | - Plant produces a complete line of sulfonated detergent type oil additives |
| 2,4-D | - Used as a herbicide. |

May, 1957

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MONSANTO - U. S. GOVERNMENT IN WORLD WAR II.

- 1939 September Monsanto Magazine for background
March- C. Belnap, Ex. V-P, Monsanto's representative on Chemical Advisory Committee, Army-Navy War Munitions Board to estimate U. S. needs.
- 1940 June 9 Employees permitted 3-weeks training in National Guard with pay
Aug. 28 Conscription policy by E. M. Q. (between G. B. #159-60)
- 1941 Oct. 3 E. M. Q. declines contract for smokeless powder plants (better suited to TNT) but offers phthalic anhydride, dibutyl phthalate, phenol, phosphorus, aniline, sulfuric and nitric acids now in production and could make methanol, formaldehyde and ammonia.
Nov. 18 W. M. Rand approved as dollar-a-year man, Production Management
Dec. 8 E. M. Q. message to employees
C. Belnap E. M. Q. telegrams to Sec'y of War and other Government officials
Dec. 31 First Navy "E" received

- 1939-42 \$23,500,000 invested in new equipment and construction useful to war effort. Government funds used only for four plants: 1) secret chemicals; 2) CWS plant (ahead of schedule and below cost); 3) munition 4) synthetic rubber.
Provided Navy Intelligence with sulfuric acid plant reports on Japan
From 1941 on, war material plants worked around the clock and holiday
" " " , Nitro plant used exclusively for rubber chemicals
- 1942 Jan. 29 First CWS \$200,000 plant, Monsanto, Ill., completed early and at less cost than estimate and turned over to Government (G. B. #162)
May Prominent news correspondents toured Monsanto plants
June 30 Dollar-a-year man policy memo
Oct. Longhorn Ordnance plant operating
Dec. 22 (St. L. P-D) Gen. McArthur sent Christmas message to employees of Monsanto Chemical Co.

In addition to the usual women in plants, art students were hired as engineers, draftsmen, other capacities where decisions were needed

Other highlights of 1942:

Monsanto Australia producing
Aid to WPB, OPA and NDRC
Theobromine and caffeine
Aviation gas work
Industrial salvage
Four dollar-a-year men

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Research devoted to war effort:

| | |
|------|---|
| 1941 | 32.5% |
| 1942 | 53.9% (90% Org., 60% Pls, Merrimac, C. R., 40% Phos.) |
| 1943 | 80% |

001370

1943 From February 5 Report for Renegotiation of War Contracts:

Seven plants producing
 80% for research
 Development work on 25 items
 Pooling patents
 Expansion of plants - manufacturing over 30 products
 Subcontracted some work
 Cooperated with other contractors
 Special risks - expansion money
 Material and other handicaps
 Refunds to CWS
 Five dollar-a-year men
 Special assignments
 Thomas, Hochwalt and Rand on Advisory Boards
 Submitted reports on chemical operations in Europe and sulfuric acid
 plants in Japan to Army-Navy Intelligence
 M-Australia - sulfanilamide, etc.
 M-Brazil formed to assure supply of theobromine
 March 10 - First shipment of styrene left Texas City Plant. Completed in 358
 days; 50,000 ton capacity; \$17,000,000 cost.

Dr. L. F. Nickell, MCL, brought from England for mutual U.S. -
 Monsanto advantage
 9% of employes salary to War Bonds
 Scrap drives
 Cooperating with South America - "Coordination of American Affairs"
 Cooperating with China Institute of America
 New England Alcohol converted to grain alcohol process
 Insect repellant
 Saflex - waterproff raincoats
 Vanillin - save space and weight
 Fernisul - prevent gun shell erosion
 DDT
 Vuepack - protect eyes
 Motors for robot bombs

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Dec. 3 Award for synthetic rubber program
 1944 March 27 W. M. Rand at Annual Stockholders Meeting: "Most of 335 items
 manufactured go to war effort."
 Sept. 30 VE Day editorial in "Monsanto News"
 1945 July 1 Assumed operation of Clinton Labs, Oak Ridge, Tennessee
 Aug. 15 Letter of Commendation to E. M. Q. from Maj. Gen. Leslie Groves for
 work on atom bomb
 Aug. 17 NDRC award to 188 employes of Central Research for work on rocket
 propellants
 Dec. 31 NR: 850 vets reemployed; 941 non-Monsanto vets employed

(The above outline has been compiled from correspondence, reports, summaries and
 commendations in the archives. It may be incomplete.)

pc
 3/14/67

001371

HOW MUCH Chemistry PER SOLDIER?



METALS

Phosphoric acid for rustproofing.
Nitric and muriatic acid for pickling.
Sulfuric acid for cleaning.
Ferrous for brass parts, buttons.

PLASTICS

Nitrocellulose for lacquers on metal parts and helmet liner.
Fibres for walkie-talkie case and dials, lenses in Polaroid goggles, gas mask parts and eyepieces. Lustron for walkie-talkie insulation and sockets.
Resinex resins for helmet liner and stopper of canteen. Seflex for water resistant raincoat or poncho.
Nylon for shoe lace tips.

AMMUNITION

Nitric acid, aniline oil, dibutyl peroxide, alcohol, mixed acid for powder and explosives. Ferrous for pickling brass cartridge cases.

RUBBER

Accelerators, antioxidants, softeners, leechers for shoe heels and soles, wire insulation, gas mask, elastic, adhesive bandages, sponge cushions in walkie-talkie.

TEXTILES

Tetrasodium pyrophosphate and trisodium phosphate for processing cotton before dyeing. Mercier and sodium bisulfite for bleaching.
Acetic acid, Glauber's salt, salicylic acid, pentachlorophenol, dinitrochlorobenzene, dinitroaniline, Santomerse, for dyes.
Aluminum chloride and sulfuric acid for carbonizing woolen cloth.
Ammonium equs for neutralizing wool after carbonizing.

LEATHER

Santelen-KR, Merenol, sodium bisulfite, sulfuric acid, sodium polysulfide, and sodium sulfide for tanning and bleaching.
Santebrite for control of microbiological activity in leather.

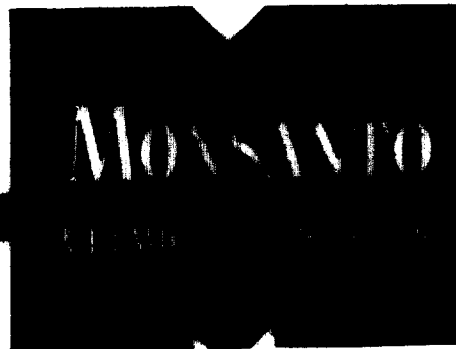
MISCELLANEOUS

Santover and Santecel for paint on helmet, eyecaps, hooks, canteen and for first aid tape and gas mask.
Sulfenamide for first aid kit.
Coumarin, vanillin, Ethyl vanillin, calcium phosphate and sodium ferric pyrophosphate for field rationing. Depes for cables.
Chlorine and aluminum sulfate for purification of water in canteen.

1916 — Hossenfelter, German consul general in New York, in a letter to von Bethmann-Hollweg, German chancellor, predicted American defeat in World War I because of our dependence then on Germany's chemical industry. "Americans can never establish such an industry," Hossenfelter wrote. "They have the resources but they lack the necessary science and technology. And, besides, the conflicting selfishness of American business renders it impossible."

1943 — You see on this page a *partial* list of "made in America" Monsanto Chemicals used to help outfit the American fighting man in World War II. (This list does not include many chemicals used in winter equipment, nor those used in outfitting other branches of the service, nor any of the many chemicals classed as military secrets.) The American spirit of free competitive enterprise, which a totalitarian mind misinterpreted as "conflicting selfishness," has built a chemical industry that was ready not only to help win this war but is ready for the tomorrow when it will help build a greater peacetime future for free men everywhere.

MONSANTO CHEMICAL COMPANY, St. Louis



SERVING INDUSTRY... WHICH SERVES MANKIND

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MANAGEMENT PERSONNEL DURING W. W. II.

In addition to the officers and directors, the records show the following division and plant managers:

| | |
|----------------------|--|
| Merrimac Division | W. M. Rand (1943: D. S. Dinsmoor), Mgr. |
| Organic Division | J. A. Berninghaus (Nov., 1943: O. Bezanson), Mgr. |
| Phosphate Division | R. R. Cole, Mgr. |
| Plastics Division | J. C. Brooks (1944: F. Williams), Mgr. |
| Anniston Plant | H. F. Weaver, Mgr. |
| Longhorn Ordnance | D. L. Eynon (Jan. 1, 1945: R. K. Mueller), Mgr. under Orga |
| Monsanto, Illinois | W. G. Krummrich (1943: P. M. Tompkins), Mgr. |
| Monsanto, Tennessee | A. T. Beauregard, Mgr. |
| Nitro, W. Va. Plant | H. K. Eckert (1942: R. L. Sibley), Mgr. |
| Queeny Plant | E. J. DePree (1943: P. G. Marsh), Mgr. |
| Springfield Plant | F. Gronemeyer (1944: K. Ire), Mgr. |
| Texas City | H. K. Eckert, Plant Mgr., W. G. Krummrich, Prod. Mgr. (under Organic) |
| Trenton, Mich. Plant | E. A. O'Neal (1944: J. Wilson), Mgr. |

Dr. C. A. Thomas directed all work on the atom bomb, of course.

Many names appear frequently in the correspondence and commendation files--too many deserving of mention to attempt further listing.

pc
3/16/67

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to these Monsanto papers 1945?
info
Monsanto owns and operates 18 plants in the United States, two in England, three in Canada, one in Australia and one in South America. In addition, eight government owned plants are operated by Monsanto, comprising 11 units. All but two of these units were designed and constructed by Monsanto engineers.

Briefly they are:

Three plants have been erected for Chemical Warfare Service by Monsanto. In 1942, 1943 and 1944 profit from two of these units amounted to \$2,112,815 all of which was voluntarily returned to the Government by Monsanto. The third CWS unit is not yet in production. The process has been demonstrated on a full commercial scale, and at the request of the Government, it is now in stand-by condition. *Shelton*

* * * *

A plant is in operation in Dayton, Ohio which Monsanto operates for the office of Scientific Research and Development.

* * * *

Also at Dayton, Ohio, Monsanto operates two additional plants which are Government owned war projects.

* * * *

At Texas City, Texas a styrene plant was designed, constructed and is operated by Monsanto for the Rubber Reserve Company. Capacity of this plant is 50,000 tons per year. This was the first of the larger Government owned styrene plants to furnish material in the synthetic rubber program. *U.S.C.*

* * * *

A Defense Plant Corporation plant is now in operation at Springfield, Massachusetts.

* * * *

Longhorn Ordnance Works, a huge Government owned TNT plant at Karnack, Texas has been operated by Monsanto since 1942.

* * * *

Under construction at Karnack adjoining Longhorn Ordnance Works is an \$8,000,000 plant for the manufacture of a rocket and jet propellant. Working in connection with the National Defense Research Council and military authorities this propellant was developed by Monsanto's technical staff at Dayton, Ohio

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* * * *

1945
On July 1, an important Government plant in Tennessee was taken over for operation by Monsanto *Clinton L. ...*

001975

In This Issue WHO SAID FORTY WAS A DEADLINE



MILERS

EPA/CERBO CORN/EL/PCB
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JULY • 1986

WOMAN'S NOW

SERVING INDUSTRY



Every hour of every day, Industry adds to the total of human health, wealth, comfort and happiness. Without its turning wheels and plumed smokestacks, our cities would be ghost towns, our farmlands would be dust bowls and empty prairie stretches. In dedicating itself to the service of Industry, modern chemistry is enlisted under the banner of service to all mankind.

MONSANTO CHEMICAL COMPANY • ST. LOUIS

MONSANTO

MONSANTO CHEMICAL COMPANY
ST. LOUIS, MO.
A CLIENT PRIVILEGE

001516

which serves Mankind

How Monsanto Serves the Public Through Industry

AGRICULTURAL — 19 products

Phosilage for treatment of enilage and fodder crops; phosphates for improving feed value; acids for rendering phosphate rock available for plant food; abrasives for polishing and sharpening of agricultural implements; plastics for tool handles, and for insulating.

APPLIANCE — 15 products

Acids and solvents for metal cleaning; lacquers for surface finishing; plastics for all types and parts of appliances.

AUTOMOTIVE — 26 products

Plastic sheets and molding compounds for safety glass, body trim and steering wheels; chemicals for fuels, lubricants and synthetic finishes; anti-oxidants and accelerators for latex sponge upholstery and for tires; acids for batteries and metals; anti-freeze.

AVIATION — 18 products

Compounds to strengthen fabric surfaces; lacquers for coatings and finishes; plastics for all aviation uses; chemicals for better tires, fuels, lubricants and metals.

BEVERAGE — 16 products

Ingredients for flavoring and sweetening; dry ice for refrigeration; phosphates for cleansers and detergents; carbonic acid gas for carbonating beverages.

CARPET AND RUG — 44 products

Accelerators and anti-oxidants for latex; dye intermediates for color; phosphates for cleaning; acids and salts for dyeing and for carbonizing wool.

CERAMICS — 10 products

Chemicals for the milling of raw materials; compounds to strengthen products during processing.

CHEMICAL PROCESS — 60 products

Heavy chemicals, intermediates, special solvents, alcohols, liquid chlorine, organics and inorganics for all types of chemical processing and synthesis.

CONSTRUCTION — 17 products

Chemicals for fire-proofing materials; phosphates and acids for cleaning; Santobrite and pentachlorophenol for preservation of lumber; lacquers for finishes; plastics for decoration.

COSMETIC, PERFUME — 18 products

Manicure lacquers and removers; wetting agents for shampoos; fixatives and solvents for perfumes; chemicals for synthesis; Vue-Pak for packages.

DAIRY — 12 products

Phosphotex as an emulsifying agent in cheese; dry ice and ammonia for refrigeration; phosphates and acids for cleaning; Santamine for sterilizing.

DENTAL — 11 products

Phosphates and flavors for tooth pastes, powders and mouthwashes; plastics for artificial dentures and tooth brushes.

DYE — 75 products

Intermediates for the production of hundreds of dyes and dry colors.

ELECTRICAL — 10 products

Plastics for insulated parts and beauty of design; lacquers and cable compounds for insulated lines; Aroclors as component in non-inflammable transformer fluid; chemicals for rubber insulation and for porcelain bodies.

ENGRAVING — 6 products

Nitric, sulfuric and acetic acids for etching; perchloride of iron in etching process; plastics for electrolytic molds.

FLORAL AND FRUIT — 7 products

Chemicals for insect control; muriatic acid for washing fruit; wetting agents for spreading of insect sprays; Vue-Pak transparent packaging material for floral boxes and displays.

FOOD — 27 products

Ingredients for flavoring and for food preservation; phosphates for self-rising flours and baking powders; Vue-Pak for packages.

GLASS, VITREOUS — 8 products

Plastic sheeting for safety glass; salt cake; acids for cleaning; wetting agents for milling of raw materials.

INSECTICIDE — 8 products

Chemicals for control of moths, termites, and peach tree borers; cresylic acid for insecticides; methyl salicylate for improving odor; wetting agents for spreading of sprays.

JEWELRY — 10 products

Abrasives for polishing and grinding; acids for etching; plastics for decorative articles of beauty and utility.

LAUNDRY — 8 products

Chemicals for bleaching and sterilizing; phosphates for detergents; Phosphotex for cleaning compounds and laundry soaps.

LUMBER — 5 products

Santobrite for prevention of sap stain in green lumber; Monsanto Permatol "A" treating solution for control of termites and rot fungi in dry lumber; lacquers for finishes.

MACHINERY — 15 products

Plastics for insulation and for decoration; acids for cleaning and pickling of steels and alloys; abrasives for grinding and polishing; lacquers and finishes.

MARINE — 25 products

Acids for pickling of steel plates; lacquers for finishing; phosphates and solvents for cleaning; plastics for instrument panels and interior trim.

METAL — 25 products

Ferric sulfate for etching; ferro phosphorus for alloys; heavy acids, phosphates and inhibitors for cleaning and pickling; acids for analytical work; abrasives for grinding and polishing.

MINING — 14 products

Flocculation agents for ore concentration; abrasives for grinding of drills and mining equipment; acids for analytical work.

PACKAGING — 7 products

Vue-Pak for fabrication of transparent packages; plastics for translucent or opaque containers; lacquers for package finishes.

PAINT — 44 products

Solvents, plasticizers and resins for lacquers and enamels; pure base materials for producing synthetic varnish resins; preservatives and deodorants for paints; lampblack; finished lacquers for special uses; anti-oxidants and anti-skinning agents.

PETROLEUM — 28 products

Chemicals for extreme pressure lubricants; pour point depressants for lubricating oils; anti-oxidants; alkalis, acids and selective solvents for extraction processes; additives for gasoline and lubricating oils.

PHARMACEUTICAL — 60 products

Salicylates, glycerophosphates and other medicinals for the alleviation of pain and the control of specific maladies.

PULP AND PAPER — 46 products

Chemicals for pulp bleaching, digesting and sizing; Santobrite for control of slime and algae; coatings for finished paper.

PHOTOGRAPHIC — 7 products

Plastics for camera cases and plastic sheets for production of animated cartoons; tri phenyl phosphate for motion picture safety film; acids for manufacture of photographic chemicals.

PLASTICS — 38 products

Plasticizers and other chemicals for production of raw plastic materials. Cellulose acetate, cellulose nitrate, cast phenolic resin, polystyrene, polyvinyl acetate and Vue-Pak transparent packaging material used for fabricating products of utilitarian value.

POWER PLANT — 17 products

Santosite for removal of oxygen from boiler feed water; Santobrite for slimes and algae control; alum and Ferriul for coagulation and silica removal.

PRINTING INK — 12 products

Lampblack and chemicals to impart color; chemicals to prevent deterioration of inks; to mask odors; to manufacture black pigments with maximum covering power; Santocel to increase viscosity and prevent tack.

RADIO — 9 products

Plastics for the manufacture of colorful cabinets, for controls and insulated parts; lacquers and thinners for finishing.

REFRIGERATION — 10 products

Dry ice for preservation of perishable foods; anhydrous ammonia for refrigeration units; inhibited acids for removing scale; cleansers and detergents.

RUBBER — 47 products

Accelerators to speed up vulcanization; anti-oxidants to prevent deterioration; softeners to improve flexing qualities; mold lubricants.

SHOE, LEATHER — 34 products

Chemicals for the production of finer, softer leather; for giving penetration to dyes; Santobrite for the control of mold growth; lacquers for finished leather goods; plastics for shoe heels and eyelets.

SOAP — 20 products

Phosphotex to enhance emulsifying and water softening properties; acids and alkalis for processing; coumarin for adding fragrance to toilet soaps; Sopanol to retard rancidity and coloration; phosphates for cleansers and detergents.

TEXTILE — 31 products

Chemicals for bleaching, dyeing, degumming and carbonizing; phosphates and wetting agents for detergents; lacquers for coating and printing; Aroclors for delustering rayon.

TRANSPORTATION — 22 products

Chemicals for the manufacture of lighter, stronger and safer steels and alloys; acids for batteries and for cleaning; abrasives for polishing; cleansers and finishes for maintenance and beauty; plastics for decoration and utility.

WATER, SEWAGE — 23 products

Liquid chlorine, ferric sulfate, aluminum sulfate and other chemicals for water purification and sewage treatment; phosphates for water softening; Santosite for conditioning of industrial boiler feed water.

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Complete information on Monsanto products available for any industry will be supplied on request. Monsanto Chemical Company, St. Louis, Mo.

WORKS — St. Louis • Carondelet, Mo. • Monsanto, Ill. • Monsanto, Tenn. • Everett, Mass. • Nitro, W. Va. • Norfolk, Va. • Anniston, Ala. • Camden, N. J. • Springfield, Mass. • Ruben, N. Wales • Sunderland, England • Dayton, Ohio (Research Laboratories) • DISTRICT OFFICES — New York • Boston • Chicago • Akron • Detroit • Birmingham • Charlotte • San Francisco • Los Angeles • Montreal • London, England • Manchester, England • Shanghai, China

CHEMICALS

Mr. Queeny
Mr. Belknap
Mr. DuBois
Mr. Sheehan
Mr. Curtis

February 5, 1943

Mr. George D. Hansen
Price Adjustment Section
Chemical Warfare Service
Washington, D. C.

MONSANTO CHEMICAL COMPANY'S PART IN THE WAR EFFORT

Dear Mr. Hansen:

In connection with the work you are doing relative to the renegotiation of our war contracts, you have requested that we inform you of the various activities of Monsanto Chemical Company and its American Subsidiary Companies in the war program. This information is presented to you with the understanding that it will be treated as strictly confidential.

As an exemplification of the spirit of the Monsanto management and entire organization towards the war effort, I quote the telegram which was sent by Monsanto Chemical Company to Mr. Henry L. Stimson, Secretary of War, to Mr. Frank Knox, Secretary of the Navy, and to Admiral Emory S. Land, Chairman of the Maritime Commission, upon the outbreak of war on December 8, 1941, as follows:

"In the state of war now existing Monsanto Chemical Company tenders its full facilities and manpower to any use to which they may be put in the defense of the nation. Please call upon us to assist in the accomplishment of any program in which we may be of help."

This spirit has continued to the present day and will continue until we are victorious in this great global war.

In telling the story of Monsanto's part in the war program, which is attached, we have followed your suggestion that it be covered under certain general headings. In addition to the topics suggested by you, we have described the various activities related to the war effort engaged in by members of our organization and also company activities of a general nature, which form a part of the war program.

Yours very truly,

Edgar M. Queeny
President

ZJD

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MONSANTO CHEMICAL COMPANY'S PART
IN THE WAR EFFORT

1942

ENGINEERING AND CONSTRUCTION WORK ON GOVERNMENT PLANTS

Beginning in the Summer of 1940, we have participated in the engineering and construction of seven government owned projects associated with the war effort. Pertinent information relative to these plants is set forth briefly as follows:

Chemical Warfare Service - First CC-2 Plant

In the Summer of 1940, we were requested by the Chemical Warfare Service to assist them in building and operating manufacturing facilities for a product connected with their war requirements. We had several conferences with them relative to their process and in November, 1940, entered into a contract for the construction of a plant according to their process at Monsanto, Illinois, estimated to cost \$2,282,000. We advised Chemical Warfare Service of our desire to undertake this work without profit and were granted a fee of \$70,000 designed in major part to repay us for non-reimbursable items of overhead expense.

Chemical Warfare Service - First DAT Plant

During the Summer of 1941, Chemical Warfare Service requested our assistance in the design and construction of a plant for the manufacture of a product designated "DAT." In this project we engineered the complete process design and supervised the construction. The process had been developed by us over a period of years and was furnished to the Government without charge. This contract was concluded on August 27, 1941 with an estimated construction cost of \$310,000. A fee of \$6,000 was requested and allowed which represented our estimated non-reimbursable expenses in connection with this work.

Styrene Plant at Texas City, Texas

During the Summer of 1941, we arranged with the Rubber Reserve Company to design and construct a plant for the manufacture of Styrene required in the synthetic rubber program. Our contract for this work dated November 13, 1941, is with Defense Plant Corporation. The size of this project has been increased several times and the plant now being constructed has an estimated cost of \$15,400,000. We have designed this plant primarily from information developed by our research organization and the project is being

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handled by us without a fee. We will actually sustain a loss on its construction. A fee will be received for its operation, but the operation had not commenced on last January 1.

Longhorn Ordnance Plant - Marshall, Texas

In December, 1941, we entered into a contract with the Ordnance Department to furnish consultant service and advice to the architect-engineer and constructor regarding the adequacy of design, engineering and construction, and in inspection of installation of production equipment for this T.N.T. Plant. We also undertook to train key personnel to operate the plant and to establish, equip and maintain adequate guard and fire-fighting forces. The total cost of this work was estimated at \$794,000 and required about one year, for which a fee of \$2.00 was paid. In the same contract we agreed to operate the plant after its completion for a fixed fee based upon the quantity of T.N.T. produced. The original contractors did not complete the construction of the plant and recently we agreed to complete the construction of the plant at an estimated cost of \$350,000 and for a fee of \$5,000.

Chemical Warfare Service - Second CC-2 Plant

During the Spring of 1942, we were requested to design and assist in the construction of a second CC-2 plant for the Chemical Warfare Service having a capacity approximately equal to the designed capacity of the first unit. This project is estimated to cost \$2,600,000, for which we requested and were granted a fee of approximately \$30,000, which we estimate is approximately sufficient to repay us for non-reimbursable items of overhead.

Chemical Warfare Service - Second DAT Project

In July, 1942, we contracted with the Chemical Warfare Service to extend the manufacturing facilities for DAT. We designed and advised on the construction of this project on the same basis as the second CC-2 plant-- a small fee sufficient only to repay us for non-reimbursable overhead items. The estimated cost of this expansion is approximately \$350,000.

NDRC Plant at Dayton

During the Spring of 1942, National Defense Research Committee requested our assistance in laboratory research work, and subsequently in the design, construction and operation of a pilot plant at Dayton, Ohio embodying the results of such laboratory work, to produce a new and confidential war product. This work is being taken care of at Dayton without expectation of profit to us. The estimated cost of the design, construction and operation is \$315,000.

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OTHER ENGINEERING WORK PERFORMED

In addition to the engineering work performed in connection with Government owned plants, it was necessary to do engineering with respect to the various extensions made to the Monsanto Chemical Company plants which are described under the heading "Expansion of Plants for War Purposes." These extensions of plant facilities were made exclusively through the use of our own funds.

Further, our engineering sales organization has assisted in the construction by other companies of ten sulphuric acid plants, which are being used directly in the war effort. This work was done as part of the service rendered by us in the sale of our catalyst for the manufacture of sulphuric acid.

DEVELOPMENT WORK

Monsanto Chemical Company, during the past two years, has devoted a great part of its research work to the solution of problems relating to the war program. The research work devoted to this cause has grown in intensity until at the present time about 80% of our research work is for purposes useful in the war program.

Following are brief descriptions of the various projects relating to the war program which have either been completed by, or are now receiving the attention of our various research departments:

1. Development of a large part of the process to be used at Texas City, Texas in the manufacture of Styrene, a raw material in the production of synthetic rubber. This involved not only the developing of the process in the laboratory, but also the construction and operation of a pilot plant to prove the numerous steps in the process. The expense of building and operating the pilot plant was borne by Defense Plant Corporation, but the cost of the research, prior to that last stage, was borne by us.
2. At the request of the National Defense Research Committee, we have done research work at our cost and without profit on a problem relating to motor fuels. This problem involved the building of a motor test laboratory containing twelve motors and the testing of hundreds of additives to motor fuels.
3. We are developing a formaldehyde process based on a method of producing this product by the direct oxidation of methane, on which we are in close contact with the Ordnance Department.

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Formaldehyde is extremely important to the war program for the manufacture of a new explosive, which is superior in several respects to the old type of explosive.

4. Development of a process for making acetylene, based on the Wulff process, which is under active consideration by the Office of Production and Research Development and which furnishes the raw material for vinyl chloride and other war essential plastics.
5. Development of a new method for making cotton fabrics water repellent is being actively studied, which we are told is important in the war program, and of a new method of permanently fireproofing cotton, which will be able to undergo in excess of a dozen launderings and dry-cleanings without seriously impairing its fire resistant properties.
6. We have developed substitutes for natural waxes which by reason of the war are not available. Samples of these waxes are now being distributed to various war industries which use waxes in their production.
7. Development of detergents which in combination with soap will give lather in salt water. These are needed for mobile laundry units for the Army and Navy.
8. We are, in conjunction with General Electric Company working on a secret polymer which has superior electrical properties for Army and Navy use.
9. In cooperation with the rubber industry, we have developed a thermosetting form of polyvinyl butyral, known as Safflex TS. This material has been successfully substituted for rubber for many coating purposes. It is being used very successfully for the manufacture of military rain coats. We have also developed a special formulation which is being used in Army pontoons. The material has many other potential uses in life vests, and all types of flotation gear for the Army, Navy and Air Corps.
10. We have developed a lining which is being used in self-sealing gas tanks for airplanes, which is resistant to gasoline and which protects the rubber portion of the tank.
11. A considerable amount of development work was done under contract with the Office of Scientific Research and Development on a plastic incendiary bomb. This work resulted in a product, which met the original specifications, but was rejected for military use because of a need for a heavier type of weapon. We were re-imbursed for a part of the cost of this research work.

12. At the request of the Navy, we developed a screen wire laminated plastic for use in place of glass in applications where the latter is objectionable because of its weight and tendency to shatter under bomb explosion.
13. We have contributed to the development of a light weight packaging material totally impervious to moisture to be used in transporting supplies by air over great distances, by working out a coating for this material which is an excellent heat sealing medium, all of which has been approved by the Air Corps.
14. We have spent considerable time and money in endeavoring to improve the quality of grinding wheel resins in order to obtain one which permits a better grinding wheel to be made, which in turn, speeds up production of steel parts ground by such resin-bonded wheels.
15. For the Bureau of Ships we have developed high-impact molding materials, which will enable contractors to mold parts which were formerly machined, thus saving valuable man hours.
16. We have developed a clear sheet cellulose acetate plastic which is used in windows in military aircraft.
17. At the request of the United States Navy we developed a plastic fuse cover which serves as a protection to anti-aircraft shells from moisture and water sprayed on board ship. These covers are proving very valuable to the Navy.
18. We have installed a laboratory and have done some work for the study of pulp molding which is a field in which the Navy is interested. We have had conferences relating to this work with officials of the Naval Aircraft factory.
19. We have done considerable work in determining the physical-mechanical properties of plastics in order to provide data for the Armed Forces and for manufacturers of war materials who are forced to use plastics by reason of the shortage of metals.
20. An important research activity of the Company has been carried on under a secret contract with the Chemical Warfare Service, under which six of our research staff are working on confidential problems.
21. We are doing considerable research work in connection with improving processes and increasing output for the manufacture of Sulfa Drugs and Sulfa Drug intermediates, which are extremely important in the war effort. Special granulations have been worked out at the request of the military forces.

22. Our research departments have developed numerous improvements in processes which have enabled us to expand production of chemicals needed for war with a minimum expenditure for critical construction materials. Following are a few examples of materials, the production of which has been so increased:

Phthalic anhydride
Tricresyl phosphate
Dibutyl phthalate
Phenol
Sodium sulfite technical
Chlorsulfonic acid

23. We have developed a process for the production of paratoluene-sulfonamid, which is needed by the Chemical Warfare Service. This process eliminates the use of chlorsulfonic acid, which is scarce and also involves a substantial saving in toluene consumption.
24. We have made extensive research study on problems relating to the use of low grade domestic materials for paper sizing, water purification, carbonizers and other purposes in place of the high grade foreign bauxite which is now being used exclusively in metallic aluminum products.
25. We have performed research work for the War Production Board in connection with making chlorine. Further, we have carried out work for the National Defense Research Committee for the development of new tanning materials for leather. Also, at the request of this Committee, we have been developing nitric acid for use by China, utilizing new raw materials. For Chemical Warfare Service, we have carried out a confidential contract for research on poison gas.

We could expand this list of research work we have done and are doing for the war effort to a much greater degree, but we believe the above examples are sufficient to demonstrate the fact that Monsanto Chemical Company's research facilities have been set aside very largely for developments useful in the war program. Although a small part of our research work has been paid for by the Government, the remainder represents an expense of this Company.

POOLING OF PATENTS

Monsanto Chemical Company, Rubber Reserve Company and nine other companies are parties to an agreement dated March 4, 1942, entitled "Agreement on Exchange and Use of Technical Information Relating to Styrene." The Attorney-General, in his letter of May 19, 1942, to the president of Rubber Reserve Company, approved this so-called pooling of technical information and patents on the manufacture of styrene.

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In accordance with the foregoing agreement, Monsanto has submitted to the Technical Director of Rubber Reserve Company a two volume report, outlining in considerable detail its technical information and developments in this field.

We have also given to the National Defense Research Committee our knowledge relating to and patent application for the making of pentaerythritol. Further, through cooperation with another company a licensing arrangement under patent has been made to facilitate work on confidential projects for the United States Navy.

EXPANSION OF PLANTS FOR WAR PURPOSES

During the course of their work in St. Louis, the representatives of the Price Adjustment Section of the Chemical Warfare Service, were given a list of the expansions of our plant facilities made through the use of our own funds. They were also informed as to the reason for each project as well as the use of the products to be manufactured therein in the war effort.

The products which are being produced in these new facilities are as follows:

St. Louis, Missouri Plant

Phthalic Anhydride
Dibutyl Phthalate
Tricresyl Phosphate
Aniline Oil
Dichloramine T
Dichloramine B
Paratoluenesulfonchioride
Para Acetyl Amine Benzene Sulfonchioride
Sulfanilamide
Sulfathiazole

Monsanto, Illinois Plant

Trichlorobenzene
Dinitrochlorbenzene
Chlorine
Phenol
Aniline Oil
Vanadium Catalyst
Nickel Catalyst
Oleum and Sulfuric Acid
Phosphorus Pentoxide

Norfolk, Virginia Plant

Theobromine

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Anniston, Alabama Plant

**Diphenyl
Aroclors
Calcium Carbide**

Trenton, Michigan Plant

Phosphoric Acid and Sodium Phosphates

Nitro, West Virginia Plant

**Thiourea
Phenyl Beta Naphthylamine**

Everett, Massachusetts Plant

**Phthalic Anhydride
Sulfuric Acid
Nitric Acid
Alcohol**

As a result of the expansions of plant facilities for production of the above products, it has been necessary to extend the power plants at the Monsanto, Illinois and Springfield, Massachusetts plants.

The expansion of our phosphorous production was completed in December, 1940. This extension increased our capacity by 40% which has greatly assisted the Chemical Warfare Service in obtaining their requirements of elemental phosphorous.

THE USE OF SUBCONTRACTORS

In connection with the major work which we have engineered and constructed for the Government on war projects, we have subcontracted work in varying degrees. In the case of all major subcontracts the actual arrangements both with reference to selection of the subcontractor, as well as the fee and terms of the contract, were developed with the governmental agency involved.

In the case of some minor contracts, we made the arrangements and received approval of the proper government contracting officer before concluding arrangements.

On our first Chemical Warfare Service project we subcontracted the engineering of utilities, foundations and general services and we subcontracted as a whole the construction work. DuPont had developed the process design. The selection of the subcontractors as well as fees on this project were negotiated at Washington. The same situation prevailed in connection with our second Chemical Warfare Service project at Monsanto, Illinois.

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Our Styrene plant at Texas City called for subletting the engineering of a portion of the process and for the subletting of all construction work. Both of these subcontracts were developed in Washington by the Defense Plant Corporation who made final selection of subcontractors.

At Dayton we sublet as a whole all construction work for the National Defense Research Committee project and in this case the arrangements were developed by us and the contract and subcontractor were approved by Washington authorities.

In connection with the recent expansions of the two Chemical Warfare Service projects at Monsanto, Illinois, we acted as architect-engineer and the Government negotiated contracts directly with constructors. On these projects we were responsible for developing the process design but sublet to a subcontractor the engineering of utilities, buildings and general services.

It has been our practice in connection with the expansion of our own facilities through the use of our funds to use subcontractors almost entirely on construction work, except in cases of expansion where it has been necessary to carry out such construction work in existing plants with minimum interference to current operations. In such latter cases, we have used our own construction force.

COOPERATION WITH OTHER SUBCONTRACTORS

In carrying out the work on several of our Government owned projects, we have cooperated with other chemical manufacturers serving as contractors on similar projects.

The first Chemical Warfare Service project we constructed from plans developed by DuPont Company in cooperation with the efforts of Dow, Chemical Warfare Service and ourselves. We were solely responsible for the design of the second Chemical Warfare Service project, as well as for the later enlargement of these facilities.

In the expansion of the first Chemical Warfare Service project at the request of the Chemical Warfare Service, we initially cooperated with Dow and DuPont to develop a standardization for the expansion. General conditions at the three locations developed to be sufficiently different to prompt Chemical Warfare Service to later alter this arrangement and directed each company to proceed along individual lines. Technical and process information was exchanged between the three contractors.

Our Styrene project was engineered by Monsanto from research information developed by ourselves and with the assistance of a subcontractor on the design of some portions of the process. Before construction was far along, Kubber Reserve Company arranged with other contractors (including Dow, Carbide and Carbon, and Koppers) to cooperate to the

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extent of exchanging process and design information. This arrangement has resulted in each of the plants having available confidential, technical information of others as a means of improving their process.

The engineering of the National Defense Research Committee plant at Dayton was accomplished by our group who cooperated with another contractor working on the same type of problem.

At Longhorn Ordnance Works, we as operators, cooperated with Ford, Bacon and Davis in the design of the general layout and utilities.

Other noteworthy instances of our cooperation with other contractors are as follows:

1. Our research laboratories at Dayton have worked with Wright Field on several pressing problems.
2. Approximately 35% of the maintenance shop facilities of our Springfield, Massachusetts plant have been made available to an outside company for machining parts for 90 millimeter anti-aircraft guns.
3. We have cooperated with Weldon Springs Ordnance Works in expediting the completion of needed new facilities for oleum at our Monsanto, Illinois plant at a much earlier date than could normally be expected.
4. We have worked closely with outside companies on a confidential naval air corps project and in the development of synthetic coatings for military uses.
5. We have done cooperative engineering work with the DuPont and United States Industrial Alcohol companies in connection with the development of plants for the production of alcohol from grain instead of molasses as raw material and at the request of Defense Supplies Corporation have processed high wines from other distilleries.

Many other specific instances of cooperation with contractors and outside companies in the furtherance of the war effort could be mentioned. In addition, we are continually cooperating with our customers producing war materials. Such work has required the close attention of our sales research and technical service departments.

SPECIAL RISKS TAKEN BY THE COMPANY

Monsanto Chemical Company has invested during 1941 and 1942 funds in excess of \$10,000,000 in expanding plant facilities to take care of demands created by the war. Most of these expansions have been made under Certificates of Necessity allowing amortization over a five year period, but circumstances may arise from which our company

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may sustain losses.

We have also spent considerable sums of money on research work with the hope of developing products useful in this war economy. For example, we have spent during the past two years approximately \$250,000 on a formaldehyde process based mainly on advice from the Ordnance Department that more formaldehyde will be needed and that it is of vital necessity to the war effort. We have no assurance that the formaldehyde project will eventuate, yet we are continuing to expend funds on this development.

MATERIAL AND OTHER HANDICAPS ENCOUNTERED

In May, 1941, Monsanto Chemical Company, realizing that the procurement of production materials and equipment would involve many restrictions established at that time a "critical materials department" to expedite the obtaining of materials and equipment. The department has been expanded from time to time as additional materials became critical and at present includes 44 employees who are actively engaged in matters pertaining to the procurement of materials, which includes maintaining a small staff of technical men at an office we have opened at Washington, D. C. While this department has experienced difficulty at various times in securing materials, it has been able to overcome most of the obstacles with the result that our production and construction has been carried on without undue delay.

The difficulty in obtaining scarce raw materials has been overcome largely through the use of substitutes. For example, our stock of imported high quality bauxite was requisitioned by the War Production Board for use in metallic aluminum products. As a substitute we are using domestic low-grade bauxite. Again, our supply of molasses for New England Alcohol Company, which comes from Puerto Rico, used in the production of ethyl alcohol has been shut off due to the submarine menace on the Atlantic seaboard. We have converted our plant facilities at considerable cost so that wheat products can be used as a substitute for molasses in the manufacture of alcohol.

REFUNDS TO CHEMICAL WARFARE SERVICE

Upon accepting the contract to construct the first plant at Monsanto, Illinois for the Chemical Warfare Service the Executive Committee of Monsanto Chemical Company decided and so informed the Chemical Warfare Service that the construction of such plant and any subsequent plants as well as the operation of the plants for the Chemical Warfare Service would be taken care of without profit or loss to us.

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In carrying out this policy, we have made certain refunds and credits to Chemical Warfare Service as follows:

| <u>Contract</u> | <u>Project</u> | <u>Amount of Refund or Credit</u> |
|---------------------------|------------------------------|---------------------------------------|
| W-266-CWS-119 | Construct CC-2 Plant | \$ 20,000.00 |
| W-266-CWS-194 | Operate CC-2 Plant | 72,844.43 |
| W-266-CWS-219 | Operate CC-2 Plant | 147,836.66 |
| W-266-CWS-266 | Operate CC-2 Plant | 210,384.05 |
| W-266-CWS-227 | Operate Dichloramine T Plant | 52,247.56 |
| Total Refunds and Credits | | <u>\$503,862.70</u> 1942 |

PERSONNEL

Monsanto Chemical Company has taken an active part in the war effort through the services of its personnel in various activities in the war program. A brief description of each type of activity follows:

\$1.00 a Year Men

The Company has contributed the services to various war agencies of the following members of its organization on the basis of \$1.00 a year:

Mr. H. M. Harker - serving as head of the Intermediate Section of the Aromatic and Intermediate Section, Chemicals Branch, War Production Board.

Mr. A. E. Smith - serving as consultant to the Aromatic and Intermediate Section, Chemicals Branch, War Production Board.

Mr. A. Kirkpatrick - serving as consultant to the Plasticizers and Glycols Section, Chemicals Branch, War Production Board.

Mr. J. R. Turnbull - serving as Chief of the Thermoplastics Unit of the Plastics and Synthetic Rubber Section, Chemicals Division, War Production Board.

Messrs. Harker and Turnbull are on a full time basis and Messrs. Smith and Kirkpatrick on a part time basis.

In addition, Mr. Tomlin of the Company's Rubber Service Department served as a \$1.00 a year man during a part of the year 1942.

Special Assignments

The assistant director of the Company's Patent Department accepted

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a temporary assignment with the Office of Petroleum Coordinator from February 23, 1942 to May 2, 1942, engaged in work on the aviation gasoline program as contract negotiator and technologist. An additional assignment along these lines was accepted for the period from May 20, 1942 to May 31, 1942.

The director of Monsanto Practice was requested by the Under-Secretary of the Navy on July 1, 1941 for duty in the Bureau of Ordnance in Washington. His time was devoted for a number of weeks to development and execution of the Navy Incentive Program which is now the Army-Navy Production Award Program. In addition, he served as an advisor to the Bureau of Ordnance for a number of months and was later recalled by Admiral Blandy, Chief of the National Bureau of Ordnance for a special assignment. It is estimated that more than 100 days were devoted to the Navy Department. All expenses in connection with these assignments were borne by the Company.

Through the director of its Export Department, the Company is represented on the Advisory Committee to the Board of Economic Warfare. This is known as the Overall Advisory Board and is comprised of a number of practical exporters in the United States who assist the Board of Economic Warfare in formulating and executing plans for the handling of export traffic other than lend-lease.

Memberships on Boards and Committees

A large number of Monsanto personnel are serving on advisory boards with various governmental agencies. A list of such personnel and their activities is as follows:

Dr. C. A. Thomas, Director of Central Research Department and a Director of the Company:

National Defense Research Committee, Explosives Division
Consultant to the Baruch Rubber Committee
Member of the General Styrene Committee for Rubber Reserve Company

Dr. C. A. Hochwalt, Assistant Director Central Research Department:

Member of National Defense Research Committee, Explosives Division
Member of the General Styrene Committee for Rubber Reserve Company

Mr. W. M. Rand, Vice President and Director of the Company:

General Procurement Consultant to Chemical Warfare Service
Member of the Chemical Advisory Committee, Army and Navy Munitions Board
Member of the Inorganic Acids and Industry Advisory Committee
Member of the Regional Advisory Committee of the War Manpower Commission
Member of the War Production Fund Committee to Conserve Manpower

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Other boards and committees on which Monsanto's personnel were represented are:

War Transportation Conservation Committee
Referee Board of the Chemical Branch of Office of Production
Research and Development
United States Department of Labor, Committee on Conservation
of Manpower
Industry Advisory Committee, Plant Facilities Section, Chemical
Branch of War Production Board.
Industry Advisory Committee on Phthalic Anhydride
Drug Resources Advisory Committee, Medicinal Chemicals Section,
Army and Navy Munitions Board
Organic Resins and Plastics Industry Advisory Committee
Vinyl Resins Producers Industry Advisory Committee
Army and Navy Board Advisory Committee on Plastics and
Nitrocellulose
Government Relation and Defense Committee, Plastics Materials
Manufacturers Association
Plastics Advisory Committee on Plywood Adhesives

General

A member of our organization who has intimate knowledge of where sulphuric acid and other plants are located in Japan transmitted information to the Military Intelligence of both the Army and Navy, regarding such locations and the capacities of such plants. A Vice President of the Company, who is well versed in European affairs, through his many visits to European countries, has consulted with the Military Intelligence of both the Army and Navy with regard to chemical operations in Europe. Others of our staff have furnished information on location and capacities of European phosphorous plants. A survey was made by a member of the Company's sales development department for the War Production Board. The director of development submitted a report to the Board of Economic Warfare containing information in regard to German synthetic phenol.

GENERAL

The assumption of responsibility for the construction and operation of Government owned plants and other work we are doing in the war effort has placed a heavy burden on the entire organization, but one we are all happy to assume.

It has been our policy to use experienced and trained engineers, accountants and others on government projects and have engaged new employees to either take their place or the place of those who might have been advanced to fill such vacated positions. Executives of the Company have put forth greater effort to be certain that these government projects are being successfully pursued and that the

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regular work of the Company continues as near as possible on a normal basis.

Monsanto (Australia) Pty. Ltd., an associated Australian Company, was requested by the Australian Government to produce sulfanilamide, sulfaguanidine and formaldehyde for war purposes. Our Development Department in St. Louis has spent considerable time and effort in assisting the Australian company in complying with the request of their government.

By reason of the inability to import raw material for the manufacture of theobromine, we have formed an American company known as Monsanto of Brazil, Inc. for the purpose of producing theobromine in Brazil which is to be used in this country. This will save valuable shipping space. Needless to say this has required the attention of several of our officials during the past several months and will require attention until the plant is placed in operation in the latter part of 1943.

The Managing Director of our British subsidiary, Dr. Lloyd F. Nickell, came to this country recently at our request and with the aid of the War Production Board and the British Government. The purpose of bringing Dr. Nickell to this country was to learn at first hand the part our British subsidiary is playing in the British war effort, what we in America can do to help in this regard, and also what we might learn from their experience and to arrange for the manufacture in England of products useful in their war effort. We are certain that Dr. Nickell's visit has been to the mutual advantage of both countries.

It may be worthy of mention that many of our men who have expert knowledge of certain chemicals which are important in the war effort are being requested by the various war agencies for information about such chemicals. This information is freely furnished and is in addition to that furnished by our men on advisory boards and committees.

Like most companies, we have successfully completed War Bond and Scrap Drive campaigns. Our employees are diverting approximately 9% of their earnings to the purchase of War Bonds.

Several of Monsanto's plants have received the Joint Army-Navy E Award "for the fine record in the production of war equipment." These plants are situated at St. Louis, Missouri, Monsanto, Illinois, Monsanto, Tennessee and Anniston, Alabama. In addition, the executive branch of the Company was awarded a Joint Army-Navy E and the two Chemical Warfare Service plants at Monsanto, Illinois were also accorded this honor.

Monsanto Chemical Company is interested in fostering friendly relations with South American countries. In this connection, we have been cooperating with the Office of Coordination of Inter-American Affairs under the direction of Mr. Nelson Rockefeller, and we plan

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...the Chinese Institute of America
...training Chinese chemists in our plants so
that they also can return to their country and give China the bene-
fit of their knowledge of American chemical practices.

Monsanto Chemical Company

St. Louis, Missouri
February 5, 1943

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Monsanto
C O M P A N Y

REF 57

Seuget, Illinois 62201
(610) 271-5835

August 16, 1968

Mr. C. W. Klassen
Technical Secretary
State of Illinois Sanitary Water Board
Springfield, Illinois 62706

Dear Mr. Klassen:

In reply to your letter of August 7, 1968, I have the following information which you need to set up a monitoring program for our industrial waste disposal site.

In general we deposit at this site those wastes which would add to the sludge load at the waste treatment plant or would dissolve in our wastewater and add to the phenol content, C.O.D. or color of the final effluent. Chemically, they fall into 6 main groups:

1. Phenols
2. Aromatic Nitro Compounds
3. Aromatic Amines and Nitro Amines (highly colored)
4. Chlorinated aromatic hydrocarbons
5. Aromatic and aliphatic Carboxylic acids
6. Condensation or reaction products of the above

A more detailed list of sources and quantities follows:

1. Still Residues - tars, condensation and decomposition products of doubtful composition but with some of the primary product remaining.

From the Distillation of:

Approx. Annual Amount

| | |
|--|----------------|
| a. Phenol | 1,020 Cu. yds. |
| b. Chlorophenol | 720 Cu. yds. |
| c. Nitro-Aniline and similar compounds | 1,700 Cu. yds. |
| d. Chlorobenzol (Tri-Tetrachlor) | 130 Cu. yds. |
| e. Chloro aniline | 1,100 Cu. yds. |
| f. Other aniline derivatives | 200 Cu. yds. |
| g. Nitro benzene derivatives | 100 Cu. yds. |
| h. Aromatic carboxylic acids (Maleic, Phthalic, etc.) | 1,500 Cu. yds. |
| i. Chlorophenol Ether | 350 Cu. yds. |

August 16, 1968

2. By-Products -

| | |
|--|----------------|
| a. Mixed isomers of nitrochlorobenzene | 1,700 Cu. yds. |
| " " " Dichlorophenol | 3,000 Cu. yds. |
| b. Waste Maleic Anhydride | 730 Cu. yds. |
| c. Waste Chlorobenzenes and Nitro-chlorobenzenes | 120 Cu. yds. |

3. Contaminated Water and Acids -

| | |
|--|----------------|
| a. Water with varying amounts of phenols (0-15%) | 7,200 Cu. yds. |
| b. Waste Sulfuric acid with chlorophenol present | 1,500 Cu. yds. |
| c. Caustic Soda Solution with chlorophenol present | 5,300 Cu. yds. |

4. Waste Solvents -

| | |
|--|----------------|
| a. Waste Methanol contaminated with Mercaptans | 600 Cu. yds. |
| b. Waste Isopropanol - Water and chlorinated hydrocarbon | 5,500 Cu. yds. |
| c. Research Waste: Miscellaneous Solvents and Materials | 1,019 Cu. yds. |
| d. Oily Materials from Oil Additive Production | 101 Cu. yds. |

5. Filter Sludge -

| | |
|---|----------------|
| a. Attapulgis Earth -Keisulguhr from Alkyl Benzene filtration | 600 Cu. yds. |
| b. Lime Mud from nitro-aniline production. | 1,000 Cu. yds. |

6. Unwanted Samples and Waste resulting from taking samples -

| | |
|------------------------------------|--------------|
| a. Chlorophenols | 72 Cu. yds. |
| b. Laboratory Samples (Everything) | 208 Cu. yds. |

Mrs C. W. Klassen

-3-

August 16, 1968

7. Miscellaneous Wastes -

These consist of spoiled material, floor sweepings, sludge from cleaning equipment and storage tanks etc which would cause problems if sewered. They are mostly reaction products of the above materials eg Esters of phenols or aliphatic alcohols with carboxylic acids such as phthallic, Maleic, or Benzoic acid, Anilides, Sulphonated phenols or other aromatics.

The relative quantities of these materials will necessarily vary according to sales of particular products and there will be additions to and deletions from this list. However, the general chemical classification will remain much the same.

Please let me know if you need any additional information.

Very truly yours,

J. R. McClain
Plant Manager

jo.